VERIFICATION OF A TRANSLATION

I, the below named translator, hereby declare that:

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That I am knowledgeable in the English language and in the language in which the below identified Japanese application was filed, and that I believe the attached English translation of the Japanese Patent Application No. HEI 11-255930 filed on September 9, 1999 is a true and complete translation of the above-identified Japanese application as filed.

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[Document Name] Specification

[Title of the Invention] MASSAGING APPARATUS

[Claims]

1. A massaging apparatus comprising a therapeutic member (26) for massaging a user's body provided so as to move along the body, characterized in that the therapeutic member (26) is provided via a supporting body (25) projecting toward the user, and a detector (40) for directly detecting a shoulder (S) of the user is provided on a position on the supporting body (25) behind the therapeutic member (26).

2. A massaging apparatus comprising a therapeutic member (26) for massaging the user's body provided so as to move along the body as set forth in Claim 1, characterized in that the therapeutic member (26) is mounted via a supporting body (25) projecting toward the user, the supporting member (25) is provided with a pair of supporting portions (25a, 25b) on which there are provided therapeutic members (26) respectively, there is provided between the supporting portions (25a, 25b) a space (X) opening toward the user and being able to receive the user's shoulder (S), and the supporting body (26) is provided with a detector (40) for directly detecting the shoulder (S) of the user within the space (X) as a range of detection.

3. A massaging apparatus as set forth in Claim 1 or 2, characterized in that the detector (40) is constructed of a

micro switch that is turned ON or OFF when it comes into contact with the user's shoulder (S).

4. A massaging apparatus as set forth in Claim 1 or 2, characterized in that said detector (40) is constructed of a pressure sensor for detecting a load applied by the shoulder (S) when it comes into contact with the user's shoulder (S).

[Detailed Description of the Invention]

[Technical Field of the Invention]

The present invention relates to a massaging apparatus capable of automatically detecting a position of a shoulder of a user.

[Prior Art]

As a conventional massaging apparatus, a chair type massaging apparatus that perform massaging motion such as kneading or rapping for the neck, shoulders, back and hip of the user by providing a massaging mechanism so as to move in the vertical direction with respect to the seatback portion of the seat is known.

As a chair type massaging apparatus, recently, a massaging apparatus provided with an automatic therapeutic function having a program stored in advance of movement or action of the therapeutic member provided with a massaging mechanism to automatically carry out a series of massaging motion according to the stored program (a series of action such as kneading and rapping) is used, and a massaging apparatus

having such an automatic therapeutic function that can perform effective massage without requiring the user to perform troublesome operation by automatically detecting the position of the user's shoulders or the like and changing the vertical position at which massaging motion is to be performed according to the seated height of the user prior to performing automatic therapy as stated in Japanese Patent Laid-Open No. HEI 6-190012 (hereinafter referred to as conventional example 1) and Japanese Patent Publication No.2511451 (hereinafter referred to as conventional example 2) has been developed.

[Problems to be Solved by the Invention]

However, in the massaging apparatus of both of the conventional examples 1 and 2, a sensor detects the pressure applied to the therapeutic member from the user's body, and the shoulder position or the like of the user is determined from a change in pressure. Therefore, since the pressure is detected also from portions of the body other than the shoulders, such as a back, complex control is required for determining the difference therebetween. In addition, the sensor is actuated frequently also by the load to the therapeutic member generated by massaging motion for the back or the like of the body, which may impair durability of the sensor or may cause the sensor to malfunction.

The sensor described above is adapted to detect the shoulder position indirectly via the load applied to the

therapeutic member, and thus the load should be applied sufficiently to the therapeutic member. Therefore, it is difficult to detect the accurate position of the shoulder stably, and thus it has a problem in accuracy of detection.

In the massaging apparatus of the conventional example 1, a spring is compressed via the arm or the like by the load applied to the therapeutic member, and displacements of the spring is detected by the sensor. Since a number of members such as the arm or the like are interposed between the sensor and the therapeutic member, the pressure is absorbed by the deformation of these members or rattling or play at the connecting portion thereof, which also cause impairment of accuracy of detection.

The massaging apparatus of the conventional example 2 has a therapeutic member formed in radially double-layered construction on the outer peripheral portion thereof and provided with a pressure sensor integrated between those layers. The problem concerning the accuracy of detection is slightly alleviated since there are fewer members interposed between the therapeutic member and the sensor in comparison with the conventional example 1. However, since such a therapeutic member has a complex and special construction, increase in cost is inevitable.

With these circumstanced in view, it is an object of the present invention to provide a massaging apparatus in which

the shoulder position can be detected accurately with a simple construction.

[Means for Solving the Problems]

In the present invention, the following technical means are instituted in order to achieve the above-described object.

The present invention provides a massaging apparatus comprising a therapeutic member 26 for massaging the user's body provided so as to be movable along the body, characterized in that the therapeutic member 26 is provided via a supporting body 25 projecting toward the user, and a detector 40 for directly detecting the shoulder S of the user is provided at a position on the supporting body 25 behind the therapeutic member 26.

In this case, for example, when the therapeutic member 26 is moved downward from the side of the user's head toward the shoulder S, the user's shoulder S is placed behind the therapeutic member 26, or under the supporting body 25 projecting toward the user, and the presence of the shoulder S thus placed is directly detected by the detector 40.

Since the detector 40 is provided behind the therapeutic member 26, the detector 40 cannot easily detect the back or the hip when the therapeutic member 26 is in contact with these portions, and thus complex control for determining the shoulder position is not necessary.

Therefore, the shoulder position can be detected

accurately in the simple construction in comparison with the case where the load applied on the therapeutic member 26 is detected as in the related art, thereby ensuring massaging motion suitable to the physique of the user.

In addition, since the detector 40 is not actuated while massaging the back and the hip, durability of the detector 40 is prevented from being lowered, thereby simplifying the structure and reducing the cost in comparison with the case where the detector is integrated in the therapeutic member.

The massaging apparatus according to the present invention is a massaging apparatus comprising a therapeutic member 26 for massaging the user's body provided so as to move along the body, characterized in that the therapeutic member 26 is mounted via a supporting body 25 projecting toward the user, the supporting member 25 is provided with a pair of supporting portions 25a and 25b on which there are provided therapeutic members 26 respectively, there is provided between the supporting portions 25a and 25b a space X opening toward the user and being able to receive the user's shoulder S, and the supporting body 26 is provided with a detector 40 for directly detecting the shoulder S of the user within the space X as a range of detection.

In this arrangement, since the shoulder S is placed in the space X between a pair of supporting portions 25a and 25b when the therapeutic member 26 is moved downward as described

above, providing a detector 40 for detecting the space X as a range of detection enables accurate detection of the shoulder S placed within the range of detection.

The detector 40 is preferably provided with a micro switch that is turned ON or OFF when it comes into contact with the user's shoulder S or a pressure sensor for detecting the load applied by the shoulder S when it comes into contact with the shoulder S. In this arrangement, the structure for detecting the shoulder position is simplified and thus implemented at low cost, and the accuracy of detection can be preferably maintained since it is adapted to come into contact with the shoulder S.

To come into contact with the user's shoulder S here includes not only a state in which the contact of the micro switch or the pressure sensor comes into contact directly with the shoulder S in itself, but also a state in which a cover covering the micro switch or the like in a operable state or a flexible covering member 15 provided on a medical treatment bed 4 so as to cover the front side of the therapeutic member is interposed between the shoulder S and the contact.

The detector 40 is not limited to the micro switch or the pressure sensor, but a sensor of non-contact type (an infrared sensor for detecting heat from the shoulder S, a reflecting-type ultrasound sensor for receiving reflected wave from the shoulder S, and the like) may be employed.

[Mode for Carrying Out the Invention]

Hereinafter, an embodiment of the present invention will be described referring to figures.

Fig. 4 shows a massaging apparatus 1 according to the present invention which is a chair type massaging apparatus comprising a chair body (therapeutic bed) 4 having a seat portion 2 on which a user sits and a seatback portion 3 for supporting the user's back.

The seatback portion 3 of the chair body 4 is provided with a moving frame 6 mounted therein so as to be moved vertically by a locomotive drive 5, and a massaging mechanism 7 is mounted on the moving frame 6. The front surface of the massaging mechanism 7 is covered with a flexible covering member 15 formed, for example, of cloth or leather.

The chair body 4 comprises a footrest 8, and a leg body 10 having arm rests 9 on both sides of the seat portion 2 formed in one piece in addition to the seatback portion 3 and the seat portion 2. The seatback portion 3 and the footrest 8 are adapted to be angularly moved with respect to the seat portion 2 by means of a suitable electric driving mechanism, a fluid pressure driving mechanism, a manual structure or the like for reclining operation.

The locomotive drive 5 comprises a longitudinal-feed-thread-shaft 11 provided so as to rotate about the axis vertically extending along the seatback 3, and a power station

12 having a motor with a speed reducer for driving the longitudinal-feed-thread-shaft 11 in the forward and reverse direction, and the longitudinal-feed-thread-shaft 11 vertically passes through a suitable portion of the massaging mechanism 7 or the moving frame 6 in threading engagement therewith. As shown in Fig. 1 and Fig. 3, there is provided a pair of upper and lower traveling rollers 13 on the left and the right sides of the moving frame 6, and the traveling roller 13 is rotatably mounted on two guide rails 14 provided in the seatback portion 3 in the vertical direction. In this arrangement, the massaging mechanism 7 is moved toward the neck or toward the hip along the upper half of the user's body seated on the seat portion 2 by the operation of the locomotive drive 5.

The position of vertical movement (amount of movement) of the massaging mechanism 7 is detected by a vertical position detecting means, not shown, and the vertical position detecting means of this embodiment includes appropriate means such as a structure to convert the number of revolution or the angle of revolution of the longitudinal-feed-thread-shaft 11 or the power station 12 into pulses by means of rotary encoder or the like and count the same, or a structure to detect the position of the massaging mechanism 7 optically by a photoelectric sensor or the like.

The locomotive drive 5 may be replaced by a wrapping

driving mechanism, an engagement structure of rack-and-pinion, or a hoist drive structure using a fluid pressure cylinder or the like.

The moving frame 6 is rectangular in shape formed by connecting the upper and the lower ends of the left and the right frame bodies 6A, 6A with the upper and the lower frame bodies 6B, 6B, and the massaging mechanism 7 comprises a drive unit 20 having a kneading motion shaft 21 and a rapping motion shaft 22 projecting toward the left and the right sides, a power station 23 including an electric motor connected to the drive unit 20, a pair of drive arms 24 extending in the lateral direction (in the direction of the width of the user's body) held by the respective motion shafts 21, 22, a supporting arm (supporting body) 25 connected to a tip of each of the drive arms 24, and roller type therapeutic members 26 rotatably provided on upper and lower ends of the supporting arm 25 via a lateral supporting shaft 30.

The kneading motion shaft 21 and the rapping motion shaft 22 are laterally disposed in parallel to each other with vertically spaced therebetween. An output from the power station 23 is fed to the drive unit 20 via a belt transmission mechanism or the like, so that the kneading motion shaft 21 and the rapping motion shaft 22 are selectively rotated via a transmission shaft, a gear, a clutch, or the like in the unit 20.

Both ends of the kneading motion shaft 21 are provided with inclined shaft portions 21a eccentrically inclined and angularly displaced with respect to the axis of rotation, and a rear end of the drive arm 24 is attached to the inclined shaft portion 21a via a bearing.

The supporting arm 25b is formed of a vertically elongated plate with its surfaces oriented toward the left and the right, and a vertical midpoint thereof is connected to the tip of the drive arm 24 rotatably about the lateral axis. Below the connecting portion between the supporting arm 25 and the drive arm 24, there is provided a tension coil spring 27 extending therebetween so that the resiliency which urges an upper portion 25a (first supporting portion) of the supporting arm 25 forward is provided.

On both lateral ends of the rapping motion shaft 22, there are provided eccentric shaft portions 22a that are off-centered with respect to the axis of rotation in the opposite direction, to which a lower end of a connecting rod 28 is pivotally connected via a bearing, and an upper end of the connecting rod 28 is pivotally connected to a lower surface of the drive arm 24 via a ball bearing or the like.

In this arrangement, when the power station 23 rotates the kneading motion shaft 21, the inclined shaft portion 21a at the both ends of the kneading motion shaft 21 allow the therapeutic member 26 opposing on the right and left sides to

each other to perform circumferential movement including laterally reciprocating movement toward and away from each other, thereby performing kneading motion.

When the rapping motion shaft 22 rotates, the eccentric shaft portions 22a on both ends thereof make the drive arm 25 reciprocate fore-and-aft (up-and-down) via the connecting arm 28, whereby the therapeutic member 26 performs the rapping motion.

While the kneading motion shaft 21 and the rapping motion shaft 22 are adapted so that a power from the power station 23 is selectively transmitted thereto via a clutch in the drive unit 20, separate special power stations may be provided for the motion shafts 21, 22 respectively so that both of them can rotate simultaneously.

The supporting arm 25 is formed of a plate of V-shape rotated by 90 degrees to the right in side view comprising the first supporting portion 25a projecting toward the user in the diagonally upper front direction and a second supporting portion 25b projecting in the lower front direction to form an obtuse angle with respect to the first supporting portion 25a, and a space X (a triangle region enclosed by dashed lines in Fig. 1) opening toward the user is formed between the first and second supporting portions 25a and 25b.

Therefore, the space X is arranged to prevent the supporting arm 25 from touching the back or the shoulder of

the user while the therapeutic member 26 is performing massaging motion.

In the first supporting portion 25a, there is provided a detector 40 for directly detecting the existence of the user's shoulder S within the space X as a range of detection on the lower side of a portion thereof behind a front end portion of the therapeutic member 26 (end on the side of the user), so that the a position of the shoulder S is determined based on the detection of the shoulder S by the detector 40.

In this embodiment, a micro switch that is turned ON or OFF by touching directly with the shoulder is shown as the detector 40, and it has a contact 40a projecting into the space X under the first supporting portion 25a.

Referring now to Fig. 1 and Fig. 2, the procedure to detect the position of the user's shoulder S using the micro switch 40 will be described.

In an initial state, the massaging mechanism 7 is stored at an upper limit position in the seatback portion 3, and in this state, the upper therapeutic member 26 projects forward by the action of the tension coil spring 27, and accordingly, the lower therapeutic member 26 is retracted since no load is applied to the therapeutic members 26 from the user (the state A in Fig. 2).

When the massaging mechanism 7 is lowered from this position, the upper therapeutic member 26 approaches or abuts

against the upper portion of the user's shoulder S, and then the user's shoulder S is placed in the space X under the first supporting portion 25a and directly touches (substantially, directly via the covering member 15) the contact 40a of the micro switch 40 to turn the micro switch 40 ON (the state in Fig. 1, the state B in Fig. 2).

Therefore, the shoulder position can be determined by the position of the massaging mechanism 7 (the value detected by the vertical position detecting means) at the moment when the micro switch 40 is turned from OFF to ON, and thus an appropriate massage according to the physique of the user can be performed by a massaging motion based on the detected shoulder position.

In this case, since the micro switch 40 detects the existence of the shoulder S directly without the medium of the load or the like with respect to the therapeutic member 26, accuracy of detection increases. In addition, since the therapeutic member 26 does not have to be made in a special shape, a simple and low-cost construction is realized.

When the massaging mechanism 7 is further moved downward, the upper therapeutic member 26 presses the back so that the shoulder S comes out from the space X, and thus the micro switch 40 is turned OFF (the state C in Fig. 2).

In other words, since the micro switch 40 is provided behind the therapeutic member 26, it detects only the shoulder

S but not the portions other than the shoulder S such as the back or the hip, and thus complex control for determining the shoulder position is not necessary. In addition, since the detector 40 makes no reaction during massaging motion on the back or the hip, lowering of durability or malfunction is prevented.

When the massaging mechanism 7 is moved downward as described above, the supporting arm 25 is adapted to rotate upward against the tension spring 27 so that the upper and the lower therapeutic members 26 abut against the back, which facilitates release of the shoulder S from the space X.

Detection of the shoulder S by means of the detector 40 may be performed in the process that the massaging mechanism 7 moves upward.

In such a case, the massaging mechanism 7 moves from position situated at a lower limit position of the seatback portion 7 upwardly with the upper and the lower therapeutic members 26 abutting against the hip or the back. In this case, the detector 40 does not come into contact with the body since it is situated behind the therapeutic member 26, thereby being maintained in OFF-state.

When the upper therapeutic member 26 comes out from the back, a pressing force applied to the lower therapeutic member 26 from the back and an energy of the tension coil spring 27 pivot the supporting arm 25 downwardly, so that the upper

therapeutic member 26 comes into contact with or approaches the upper portion of the shoulder S.

At this moment, the shoulder S comes into the space X and thus comes into contact with the detector 40, so that the shoulder S is detected.

In the construction in which the shoulder position is detected in the process that the therapeutic member 26 moves upward, even when the seated posture with respect to the chair body 4 is not correct, the therapeutic member 26 presses the hip or the like to stretch the back and correct the posture so that the back is fitted with the seatback portion 3, and thus subsequent detection of the shoulder S can be performed accurately.

The present invention is not limited to the embodiment described above, but rather modifiable as appropriate.

For example, the detector 40 is not limited to a micro switch, but a pressure sensor that comes into contact with the shoulder S and detects the pressing force thereof, or even a non-contact sensor is applicable. In case of the contact micro switch or the pressure sensor, a cover may be provided for covering the contact 40a in a state in which ON-OFF switching operation can be performed. The detector 40 may be provided on one of the left and the right supporting arms 25, or on both of them.

The position on the supporting arm 25 to mount the

detector 40 may be changed to any position within a range that the space X for detection can detect the shoulder S appropriately depending on the type of the detector 40.

The first supporting portion 25a and the second supporting portion 25b of the supporting arm 25 do not have to be a single piece, and thus they may be constructed of separate members respectively. The supporting arm 25 may even be constructed only of a first supporting portion 25a.

The driving mechanism for the therapeutic member may be replaced by the one that drives the supporting arm and the therapeutic member by an air cell that is inflated and deflated by supplying and discharging air, for example, and the massaging apparatus is not limited to the chair type, but rather be modifiable to other configuration such as the bed type.

[Effect of the Invention]

As described thus far in detail, according to the present invention, accurate detection of the shoulder position is realized in a simple construction.

[Brief Description of the Drawings]

Fig. 1 is a side view of a massaging mechanism according to an embodiment of the present invention.

Fig. 2 is a view showing a principle of a detection of a shoulder position.

Fig. 3 is a perspective view of the massaging mechanism.

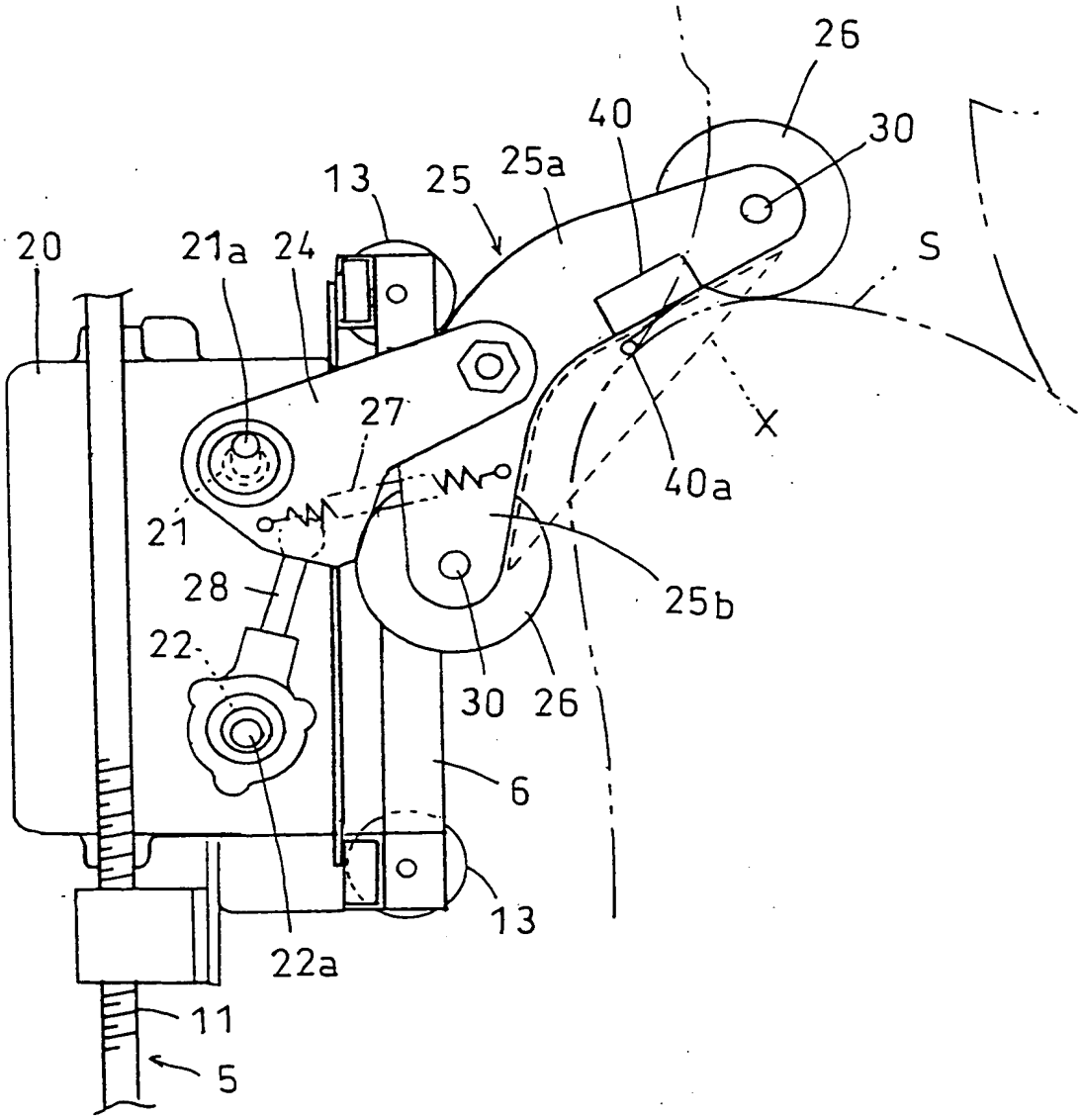
Fig. 4 is a general perspective view of the massaging

apparatus.

[Description of the Reference Numerals]

1	massaging apparatus
25	supporting arm
26	therapeutic member
40	detector

FIG. 1



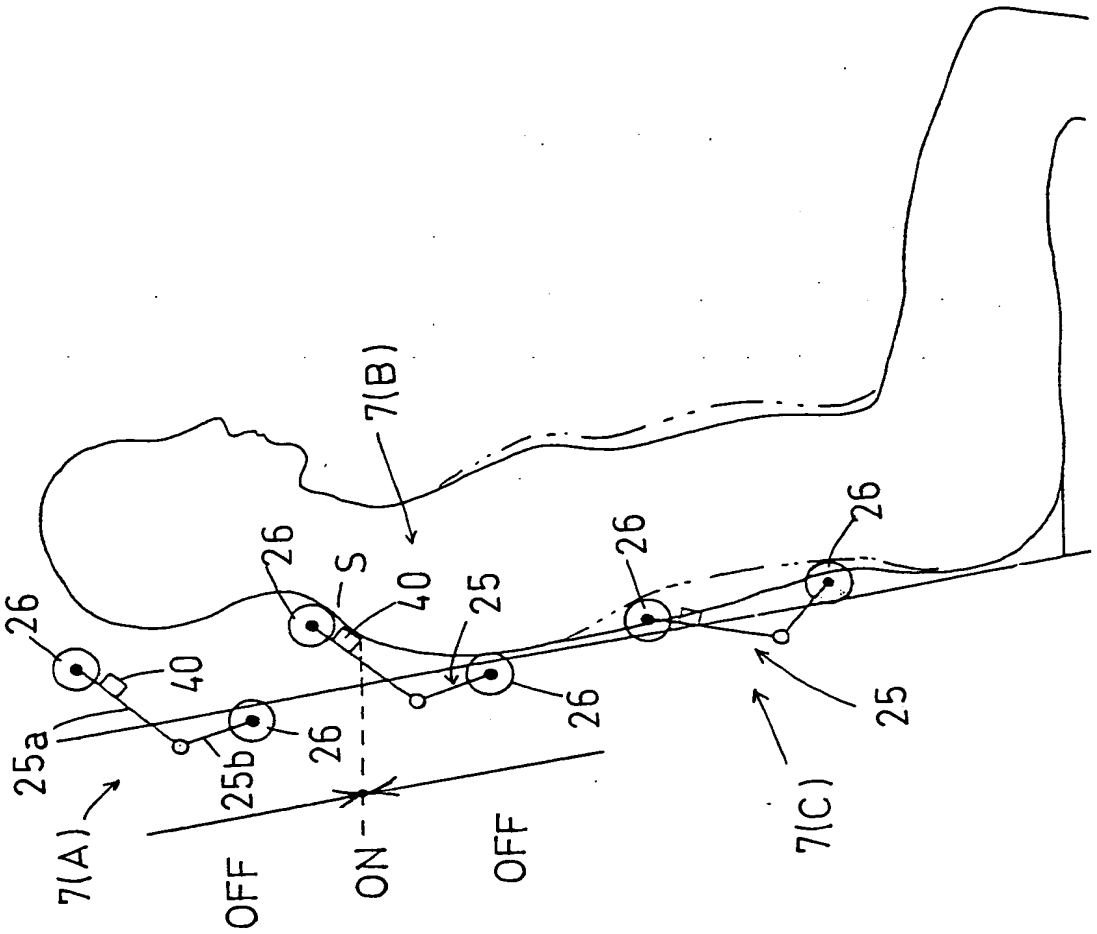


FIG. 2

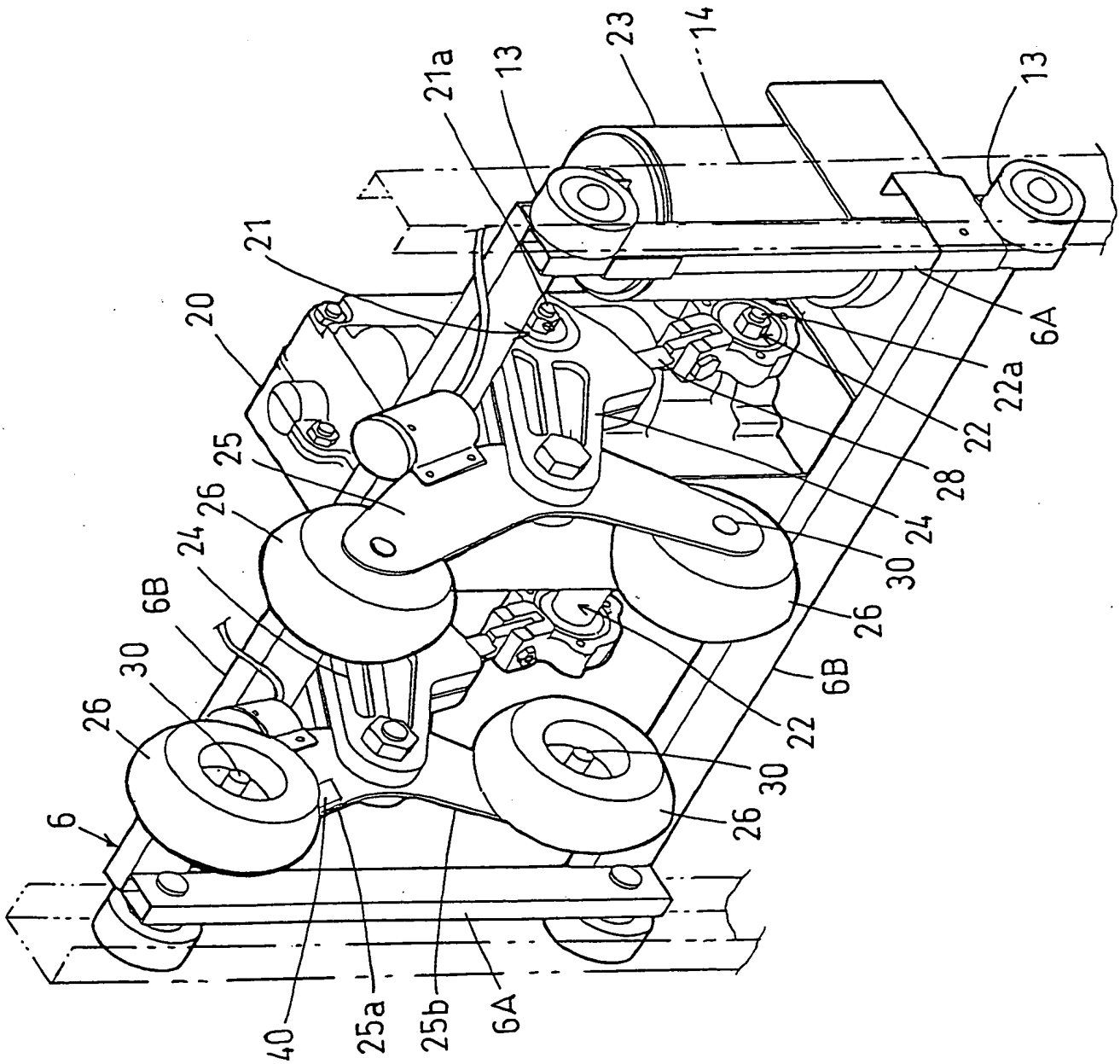
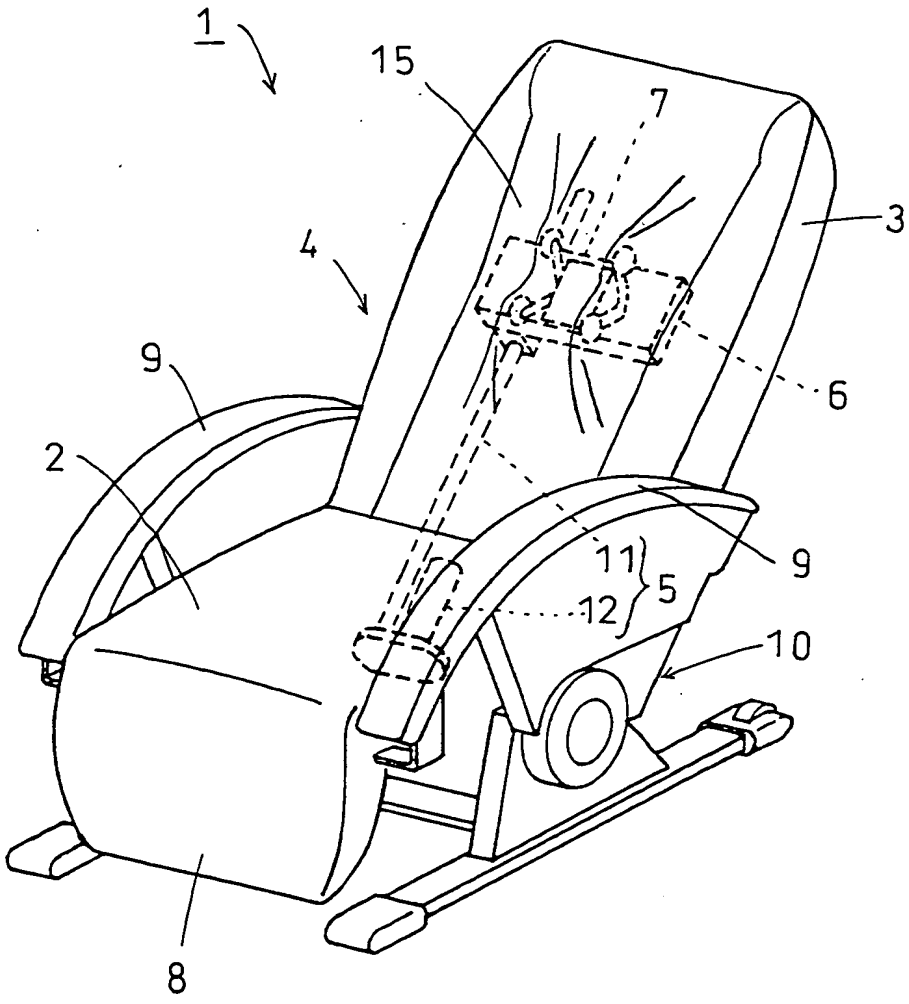


FIG. 3

FIG. 4



[Document Name] Abstract of the Disclosure

[Abstract]

[Object]

To provide a massaging apparatus capable of accurately detecting shoulder positions in a simple construction.

[Means for Solving the problem]

A massaging apparatus including a therapeutic member 26 for massaging a user's body provided so as to move along the body in which the therapeutic member 26 is provided via a supporting body 25 projecting toward the user, and a detector 40 for directly or indirectly detecting the shoulder S of the user is provided on a position of the supporting body 25 behind the therapeutic member 26.

[Selected Drawing] Fig. 1